

To: Way, Steven[way.steven@epa.gov]; Dhieux, Joyel[Dhieux.Joyel@epa.gov]; Guy, Kerry[Guy.Kerry@epa.gov]; Peronard, Paul[Peronard.Paul@epa.gov]; Petri, Elliott (Elliott.Petri@WestonSolutions.com)[Elliott.Petri@WestonSolutions.com]; Nicholas MacGregor[nmacgregor@harwest.com]; Matt Francis[m.francis@erllc.com]
Cc: Don Deere[don.deere@deereault.com]; Christoph Goss[christoph.goss@deereault.com]
From: Christoph Goss
Sent: Thur 5/19/2016 5:39:07 PM
Subject: Notes from May 17 Meeting and PDF Plan Set

Hi Everyone

Here is a link to the PDF version of the progress set plans I gave out at the Tuesday meeting. I also posted the extents of Gold King Level 7 (courtesy of DRMS) superimposed on a Google Earth Pro aerial photo for your reference.

<https://spaces.hightail.com/receive/0Tb0E>

I also want to summarize some of the items we discussed yesterday. Please let me know if you concur.

1. Fluid hazard Analysis
 - a. EPA will review 5/5/2016 submittal that includes horizontal drain
 - b. Further revisions on hold until EPA review is complete
 - c. EPA staff available to facilitate fluid hazard meeting
2. Horizontal Drain
 - a. Horizontal drain concept was discussed
 - i. Drill through grouted casing and blowout preventer from portal cut left wall into old workings behind known collapse at adit springline
 - ii. Drain old workings into existing pipes at manhole or sump

- iii. Camera hole to evaluate conditions in old adit
 - iv. Install valve and piping system to drain into existing sump and piping system
 - b. Estimated time to install drain is 2 weeks. Unknown is the quantity of water in the old workings and how long that would take to drain.
 - c. D&A was asked to use their recently developed CAD model to estimate possible water quantities. This has now been completed:
 - i. Estimated volume at 10 ft head = 0.5 million gallons, estimated volume at 30 ft head = 1.6 million gallons
 - ii. Outflow, assuming an 8 inch hole, would vary from 1300gpm at 10 ft head to 2800 gpm at 30 ft head. The rate would be controlled by a valve at the blow off preventer to what the system could handle.
 - iii. Assuming a flow of 500gpm from the new Gold King adit and a system capacity of 1500 gpm, the flow from the horizontal drain could be held at 1000 gpm until the old adit was mostly drained. This would take between half a day to just over one day.
 - d. Concerns were raised about drilling fluid type, disposal, and possible effect on treatment plant (D&A has contacted driller to clarify)
 - e. If drill punches into rubble instead of a void, the hole will have to be partially or completely re-drilled (D&A has contacted driller to clarify options to re-drill from initial hole collar and blow off preventer)
 - f. If drilling of horizontal drain is approved, it would take place in August 2016, after underground rehabilitation is complete but before the portal arches are installed
 - g. D&A will develop the concept further. This will include reviewing mine geologic mapping, adjusting angles for constructability and likelihood of reaching a void space, and sizing pipes/valves.
- 3. Vibrating wire piezometer
 - a. To be installed in North Cement Creek fracture zone upstream of American Bulkhead #2
 - b. If approved, installation would take place during the same mobilization as the horizontal drain drilling in August 2016
- 4. Stand pipe piezometer into American Tunnel upstream of Bulkhead 3

- a. Access, drill pad, etc will require coordination with BLM and USFS
 - b. EPA would like to have Sunnyside Gold install well
 - c. No further design or investigation this year
 - d. Per D&A bulkhead memo dated 3/24/2016, pressure on Red & Bonita bulkhead should be kept below 50 ft of head until this well is installed
5. Tunnel muck
- a. 120 cy of material anticipated to be mucked out of adit during 2016
 - b. Material transport and disposal options were discussed.
 - c. Disposal could include same location as treatment plant solids or stabilization with cement and leaving at toe of Gold King Mine dump.
 - d. If left at mine, material should be tested to confirm it does not produce contaminated run-off
6. Portal Arches
- a. D&A will design new footers in response to as-constructed concrete floor
 - b. Portal backfill options were discussed
 - i. MSE block wall with gravel drain, geogrid, and soil backfill
 - ii. Cast in place concrete wing wall with gravel drain and soil backfill
 - iii. Cellular concrete or foamed flyash backfill with gravel drain and soil fill on top
 - c. D&A noted that all of these backfill options would be acceptable. D&A will design backfill option based on cost, availability, and contractor preference
7. Monitoring Plan
- a. D&A will develop monitoring plan for closing Red & Bonita bulkhead
 - b. Monitoring plan to be coordinated with Weston Solutions overall monitoring plan

- c. Monitoring plan to include observations in Adams Mine and Mogul. D&A to coordinate with DRMS
- d. D&A to design long term support for Red & Bonita adit near portal
- 8. Construction Drawings
 - a. Plan progress set dated 5/16/2016 was passed out for review and comment
 - b. HW noted change in steel set anchors from resin to mechanical

Christoph

Christoph Goss, PhD, PE

Civil Engineer, Principal

Deere & Ault Consultants Inc.

600 S. Airport Rd. Bldg A Suite 205

Longmont, CO 80503

USA

Tel: 303.651.1468

Fax: 303.651.1469

Mobile: 720.560.1458

Christoph.goss@deereault.com

www.deereault.com

